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What is claimed is:

Size

sb B1 1. ~~The multifunctional~~ Apparatus for forming mineral fibers of a ~~diameter~~ ¹⁰⁰ between 7 and ~~20~~ microns wherein the apparatus comprises:

(a) A vertically oriented furnace having a first side, and a second side opposite the first side, ~~wherein said furnace can be oriented horizontally having one side;~~

(b) a first and second melting chambers, wherein the chambers are at the top of the furnace and wherein the first chamber is positioned at the first side and the second chamber is positioned at the second side;

(c) a first adjustable sloped valley member under the first melting chamber, and a second adjustable sloped valley member under the second melting chamber;

(d) a vertical stack of horizontal valley members, wherein each horizontal valley member has an open ^{ing} to permit molten material to cascade down the stack;

(e) a glass collector member for receiving the molten material from the stack;

(f) two forehearth for receiving the molten material from the collector member;

(g) a raised throat which retains higher-density glass component ^s in the collector member and permits the passage of lower-density glass components; and

(k) two-chamber ceramic ~~composite~~ bushings in each of the fore hearths, wherein each bushing comprises at least two ceramic plates with orifices; wherein the valley members have various heights to promote mixing and degassing and wherein each bushing further comprises water-cooled fins comprising TiNi intermetallic walls, wherein the TiNi is water vapor permeable.

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2. The multifunctional apparatus of claim 1, wherein first and second melting chambers are able to rotate when the rock mineral is loaded and melted and wherein each chamber comprises two cone shape shield members having different size: the bigger one is housing a cone shield made of refractory metallic material and the smaller a ceramic cone (tipped melting chamber where the melting of rock minerals is proceeded) is made from a thermal shock resistant, high-dimension stability refractory ceramic material. Wherein said ceramic melting chamber is an extension of the metallic cone shield that is engaged into the metallic cone shield in such a way that it can be removed and replaced.
 3. The multifunctional apparatus of claim 1, wherein said chambers comprising natural gas containing oxygen burners and electric heating members are designed to melt rock material.
 4. The multifunctional apparatus of claim 1, wherein said sloped valley having an adjustable angle is positioned above said collector, wherein said sloped valley comprises a passageway with zones having different depths to provide glass body turbulent during flowing that causes an efficient mixing and volatile elements degasing.
 5. The multifunctional apparatus of claim 1, wherein a stack of horizontal valleys is positioned lower said sloped valley and above the collector. Wherein a stack of horizontal valley members is positioned inside of vertical furnace one beneath the other designed to cause a glass body turbulence as it flows toward the collector, wherein quantity of said horizontal valleys is varied depending on the glass body viscosity.

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6. The multifunctional apparatus of claim 1, wherein a valve member is located beneath the collector to provide a periodical removal of the high-specific density gravity glass body components which drain off as they tend to accumulate at the bottom of collector.
 7. The multifunctional apparatus of claim 1, wherein a collector - glass body receiver is located at the bottom of vertical apparatus, wherein said collector is designed for glass body homogenization and averaging of both the chemical composition and a viscosity.
 8. The multifunctional apparatus of claim 1, wherein said ceramic-composite bushing member comprises the upper and the lower chamber members, wherein the lower chamber is abutted to the bottom of the upper chamber.
 9. The multifunctional apparatus of claim 8, wherein said bushing member made of thermal shock resistant and a high-dimension stability inert ceramic material. Wherein the bottom of said upper chamber is referred to as an intermediate platform containing openings through which the glass body flows to the lower chamber. Wherein the opening of the intermediate platform are designed the reduction of a hydrostatic pressure inside of the lower chamber.
 10. The multifunctional apparatus of claim 8, wherein said ceramic -composite bushing is located beneath of the collector (it is a central bushing) and the other periphery bushings are located beneath of the forehearths sleeves, wherein two or three said bushing members are located beneath the each said fore hearth member.

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11. The multifunctional apparatus of claim 8, wherein said ~~two-chamber~~ ceramic-composite bushing member comprises a vertically extended external thermal insulating layer positioned around of a bushing, wherein the insulating layer is thick enough to avoid a temperature gradient nearby of the walls of both the upper and the lower chambers.
12. The multifunctional apparatus of claim 8 wherein said two-chamber ceramic - composite bushing member is mounted to and located beneath the collector and the forehearth member by means of a supporting frame member which is comprised of several traverses made of a refractory, high-flexural strength metallic material.
13. The multifunctional apparatus of claim 1, wherein a vertical shaft member is located at the center inside of furnace and extended from the top to the bottom of the furnace of apparatus. Wherein central vertical shaft is designed to support the stack of internal horizontal valleys positioned inside of furnace.
14. The multifunctional apparatus of claim (1), wherein said furnace, depending on the mineral (basalt) rock chemical content and viscosity properties, can be modified from vertical to horizontally extended when the low-viscosity rock basalts are used.
15. The multifunctional apparatus of claim 1, comprising two forehearths associated with feeder -distributor of glass body to the bushings. Wherein each forehearth

is connected to the collector through a step. Wherein the height of step between the collector and each sleeve is designed to prevent the entrance of high-specific density components to the periphery bushings.

16. The multifunctional apparatus of claim 1, wherein said chambers to melt rocks and ceramic bushing members can be removed and replaced without interruption of apparatus operation, wherein the lower chamber of ceramic bushing comprising ceramic plates with orifices can be removed and replaced when the housing upper chamber of a bushing still remains in place.

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17. The multifunctional apparatus of claim 1, wherein said sloped valley member can be used without stack of horizontal valleys. Wherein the angle of said sloped valley and the quantity of horizontal valleys in stack is varied depend on properties of rock material and they are adapted to prepare homogenous glass body suitable to manufacture amorphous fiber by size (diameter) from 7 to 20 microns, wherein said amorphous basalt fibers are manufactured from basalt rocks with variety of petrology, morphology properties such as (but not limited) gabbro, olivine, andesite, high-moduli acidic and Al-rich basalts including (but not limited) Northern Wisconsin Lake Superior basalt rock depositions.